

Structure	Silicon Monolithic Integrated Circuit
Product series	PWM Driver for combi drive
Type	<b>BD7791KVT</b>
Function	<ul style="list-style-type: none"> <li>▪ 3-phase-sensor-less system, therefore don't need three hall sensors for spindle motor driver.</li> <li>▪ Stability high-speed start from the state of the stop for spindle motor driver.</li> </ul>

○ Absolute maximum ratings

Parameter	Symbol	Limits	Unit
Power MOS supply voltage	PVcc	6	V
Control circuit power supply voltage	Vcc	6	V
Maximum driver output current	IoMAX	3 #1	A
Power dissipation	Pd	1.37 #2	W
Operating temperature range	Topr	-30~85	°C
Storage temperature range	Tstg	-55~150	°C
Joint part temperature	Tjmax	150	°C

#1 The current is guaranteed 3.0A in case of the current is turned on/off in a duty-ratio of less than 1/10 with a maximum on-time of 5ms and when short brake.

#2 PCB (70mm × 70mm × 1.6mm, occupied copper foil is less than 3%, glass epoxy standard board) mounting. Reduce power by 11.0mW for each degree above 25°C.

○ Recommended operating conditions (Ta = -30 ~ +85°C)

[Set the power supply voltage taking allowable dissipation into considering]

Parameter	Symbol	MIN	TYP	MAX	Unit
Power MOS supply voltage	PVcc	4.0	5.0	5.5	V
Control circuit power supply voltage	Vcc	4.0	5.0	5.5	V

This product isn't designed for protection against radioactive rays.

Status of this document

The Japanese version of this document is the formal specification.

A customer may use this translation version only for a reference to help reading the formal version.

If there are any differences in translation version of this document, formal version takes priority.

○Electrical characteristics

(Unless otherwise noted Ta=25°C, Vcc=PVcc=5V, Vref=1.25V, RL(ACT,STP,LOAD)=8Ω+47μH, RL(SP)=2Ω+47μH, RNF=0.2Ω, CTL1,2=3.3V, GVSW=0V, VIN1,2,3,4,5,6=OPEN, VCOM=OPEN, VCCOM=OPEN, VCOUT=OPEN)

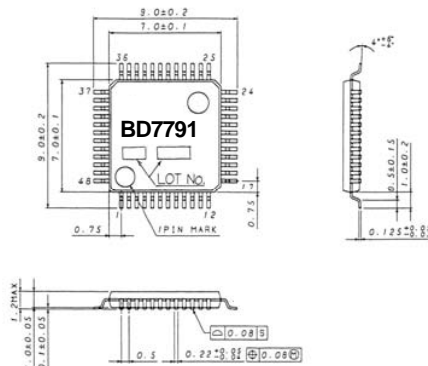
Parameter		Symbol	MIN.	TYP.	MAX.	Unit	Condition
Circuit current	Quiescent current	ICC	—	8	20	mA	CTL1,2=H
	Current in standby mode	IST	—	—	0.2	mA	CTL1,2=L
Actuator driver block	Input dead zone (one side)	VDZACT1,2,3	—	—	3	mV	
	Output offset voltage	VOO1,2,3	-50	—	50	mV	Voltage gain 1, 2
	Voltage gain 1 (CH1,2,3)	GVC1_1,2,3	15.5	17.5	19.5	dB	External input resistor 10kΩ
	Voltage gain 2 (CH1,2)	GVC2_1,2	10	12	14	dB	External input resistor 10kΩ, GVSW=H
	Output On resistor (top and bottom)	RON1,2,3	—	1.2	1.8	Ω	Io=500mA
	PWM frequency	f1,2,3CH	215	310	405	kHz	Voltage gain 1, 2
Stepping driver block	Input dead zone (one side)	VDZ4,5	10	30	50	mV	
	Output offset voltage	VOO4,5	-50	—	50	mV	
	Voltage gain	GVC4,5	15.5	17.5	19.5	dB	
	Output On resistor (top and bottom)	RON4,5	—	1.6	2.4	Ω	Io=500mA
Loading driver block	Input dead zone (one side)	VDZ6	20	60	100	mV	CTL1=H, CTL2=L
	Output offset voltage	VOO6	-50	—	50	mV	CTL1=H, CTL2=L
	Voltage gain	GVC6	15.5	17.5	19.5	dB	CTL1=H, CTL2=L
	Output On resistor (top and bottom)	RON6	—	1.8	2.7	Ω	Io=500mA, CTL1=H, CTL2=L
Spindle driver block	Input dead zone of gm1(one side)	VDZSP1	2	30	100	mV	
	Input dead zone of gm2(one side)	VDZSP2	6	90	300	mV	GVSW=M
	Input dead zone of gm3(one side)	VDZSP3	10	150	500	mV	GVSW=H
	Input output gain 1	gm1	0.88	1.1	1.32	A/V	
	Input output gain 2	gm2	0.28	0.36	0.44	A/V	GVSW=M
	Input output gain 3	gm3	0.17	0.22	0.27	A/V	GVSW=H
	Output On resistor (top and bottom)	RONSP	—	0.6	1.4	Ω	Io=500mA
	Output limit voltage	VLIMSP	0.18	0.22	0.26	V	
Others	PWM frequency	fSP	—	167	—	kHz	
	Vref drop mute ON threshold voltage	VMVref	—	0.7	1.0	V	
	Vcc drop mute ON threshold voltage	VMVccD	3.2	3.6	4.0	V	
	CTL1 L voltage	VCTL1L	0	—	1.0	V	
	CTL1 H voltage	VCTL1H	2.0	—	3.3	V	
	CTL2, GVSW L voltage	VCTL2L, VGV L	0	—	1.0	V	
	CTL2, GVSW M(Hi-z) voltage	VCTL2M, VGV M	1.6	—	2.0	V	OPEN (Hi-z) is also available.
CTL2, GVSW H voltage	VCTL2H, VGV H	2.6	—	3.3	V		

GVSW	L	M (Hi-z)	H
Spindle gain mode	gm1	gm2	gm3
CH1,2 gain mode	GVC1_1,2		GVC2_1,2

CTL1	CTL2	Brake mode	SPINDLE Output	CH1,2,3 Output	CH4,5 Output	CH6 Output
L	L	—	Hi-Z	Hi-Z	Hi-Z	Hi-Z
	M	Short brake	ACTIVE	Hi-Z	Hi-Z	Hi-Z
	H		ACTIVE	ACTIVE	ACTIVE	Hi-Z
H	L	Reverse brake	Hi-Z	Hi-Z	ACTIVE	ACTIVE
	M (Hi-z)		ACTIVE	Hi-Z	Hi-Z	Hi-Z
	H		ACTIVE	ACTIVE	ACTIVE	Hi-Z

Please supply the middle level voltage for CTL2 when using it in the mode of CTL1=L and CTL2=M.

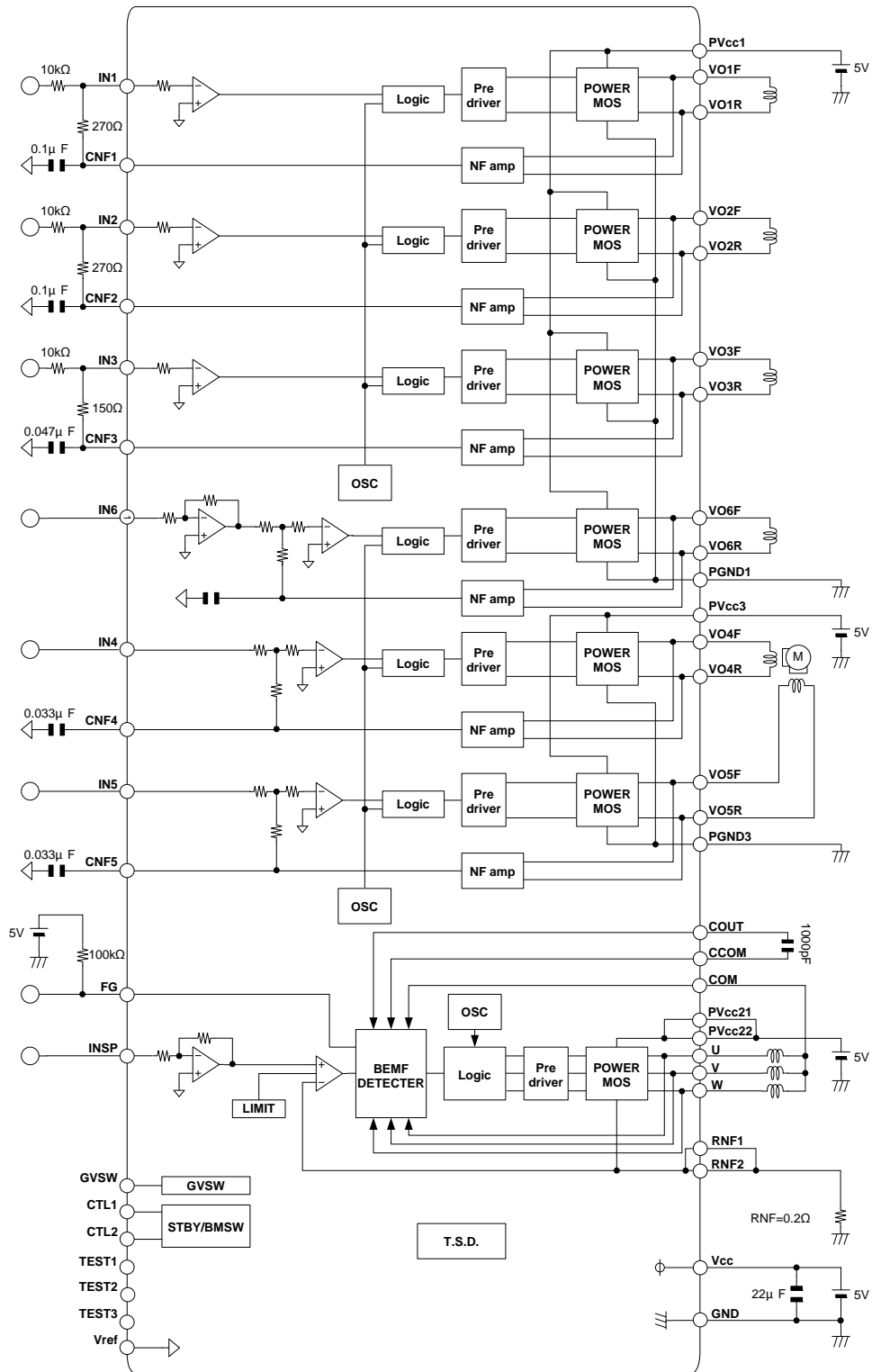
○Package outlines



(UNIT : mm)

OBlock diagram / Application circuit

The external constants concerning CH1,2 are values optimized in case  $4\Omega + 47\mu\text{H}$  is assumed as a load, and those concerning CH3 are values optimized in case  $4\Omega + 10\mu\text{H}$  is assumed as a load.



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